In the Claims:

Please amend the claims as follows.

1.   (Currently Amended) A method of controlling particle size of an emulsion polymer including the step of controlling the amount of in-process monomer present ~~during~~ throughout the polymerization reaction.

2.   (Original) The method of claim 1 wherein the level of in-process monomer is less than about 8 %wt, based on the total weight of the reaction mixture.

3.   (Original) The method of claim 2 wherein the level of in-process monomer is less than about 7 %wt, based on the total weight of the reaction mixture.

4.   (Original) The method of claim 3 wherein the level of in-process monomer is less than about 5 %wt, based on the total weight of the reaction mixture.

5.   (Original) The method of claim 1 wherein emulsion polymer comprises as monomeric units one or more compounds selected from (meth)acrylic acid, (meth)acrylamides, alkyl (meth)acrylates, vinyl aromatic monomers, vinyl alcohol esters, nitrogen-containing ring compounds and their thio-analogs, or substituted ethylene monomers.

6.   (Original) The method of claim 5 wherein the emulsion polymer comprises as monomeric units one or more compounds selected from (meth)acrylic acid, (meth)acrylamide, alkyl (meth)acrylate, vinyl aromatic monomer or vinyl alcohol ester.

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7.   (Currently Amended) A method of controlling standing monomer level in a polymerization reaction including the steps of a) detecting coolant temperature at a cooling jacket inlet; b) detecting coolant temperature at a cooling jacket outlet; c) detecting coolant flow rate; d) calculating Q_{jdyn} (raw) and U_{raw} wherein U_{raw} is capped such that $U_{min} < U_{raw} < U_{max}$; e) obtaining U_{filt} by inputting U_{raw} into a low pass first order filter; f) calculating, using the values obtained in steps a through e, a value for the dynamic jacket heat removal; g) calculating a heat release value of polymerization using the dynamic jacket heat removal value; h) comparing the calculated heat release value of polymerization to a target heat release value of polymerization; i) calculating, using the value obtained in step h, the level of in-process monomer in the polymerization reaction; and j) controlling the rate of monomer addition to the polymerization reaction, based upon a comparison the value obtained in Step i with a target in-process monomer level, such that a desired level of in-process monomer is maintained.

8.   (Original) The method of claim 7 wherein the polymerization reaction is an emulsion polymerization.

9.   (Original) The method of claim 7 wherein the level of in-process monomer is less than about 8 %wt, based on the total weight of the reaction mixture.

10.   (Original) An apparatus for controlling standing monomer level in a polymerization reaction including: a) temperature detecting means for detecting coolant temperature at a cooling jacket inlet; b) temperature detecting means for detecting coolant temperature at a cooling jacket outlet; c) detecting means for detecting coolant flow rate; d) computing means for calculating Q_{jdyn} (raw) and Uraw wherein Uraw is capped such that Umin < Uraw < Umax; e) means for obtaining U_{filt} by inputting Uraw into a low pass first order filter; f) means for calculating a value for the dynamic jacket heat removal; g) means for calculating a heat release value of polymerization

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using the dynamic jacket heat removal value; h) means for calculating a difference between the calculated heat release value of polymerization and a target heat release value of polymerization; i) computing means for determining the level of in-process monomer in the polymerization reaction; and j) controlling means for controlling the rate of monomer addition to the reactor such that a desired level of in-process monomer is maintained.

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